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EXAMINER

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ART UNIT

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2613

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This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☐ Responsive to communication filed on \_\_\_\_\_ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), \_\_\_\_\_ days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- ☒ Notice of References Cited by Examiner, PTO-892.
- ☒ Notice of Draftsman's Patent Drawing Review, PTO-948.
- ☒ Notice of Art Cited by Applicant, PTO-1449.
- ☐ Notice of Informal Patent Application, PTO-152.
- ☐ Information on How to Effect Drawing Changes, PTO-1474.
- ☐ \_\_\_\_\_

Part II SUMMARY OF ACTION

- ☒ Claims 1-18 and 34-48 are pending in the application.  
Of the above, claims \_\_\_\_\_ are withdrawn from consideration.
- ☒ Claims 19-33 have been cancelled.
- ☐ Claims \_\_\_\_\_ are allowed.
- ☒ Claims 1-4, 7, 8, 34, 35, 40, 42-45 and 47 are rejected.
- ☒ Claims 5, 6, 9-18, 36-39, 41, 46 and 48 are objected to.
- ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.
- ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.
- ☐ Formal drawings are required in response to this Office action.
- ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).
- ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).
- ☐ The proposed drawing correction, filed \_\_\_\_\_, has been ☐ approved; ☐ disapproved (see explanation).
- ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.
- ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
- ☐ Other

EXAMINER'S ACTION

Art Unit: 2613

1. The drawings are objected to because legends are required for block elements in Fig. 1. Correction is required.
2. Applicant is required to submit a proposed drawing correction in response to this Office action. However, correction of the noted defect can be deferred until the application is allowed by the examiner.
3. Although applicant's claims 3 and 4 meet the requirement of 112/2d, i.e. the meters and bounds are determinable, the spelling could be improved. Examples are the terminology "include" in claims 2 and 3, which should be read as "includes". It is in the best interest of the patent community that applicant, in his/her normal review and/or rewriting of the claims, to take into consideration these editorial situation and make changes as necessary
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --  
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 2613

Claims 1, 2, 3, 34, 35, 40, 42, 43, 45 and 47 are rejected under 35 U.S.C. § 102(e) as being anticipated by Wilder et al (cite by Applicant).

Wilder et al show in Figs. 1-6, the same imaging device (an image sensor 10), semiconductor substrate (n-type substrate in Fig. 13A), plural light-responsive image elements defined in an array on the substrate (photodiodes PD are shown in Fig. 13A), means for randomly accessing the image elements individually or in groups of less than the full plurality of elements on the array (a row decoder driver 12 and column decoder driver working in conjunction with a signal processor/computer 18 randomly access the photodiodes PD individually or in groups of less than the full plurality of photodiodes on the sensor, cols. 5 and 6) as claimed in claim 1.

Furthermore, Wilder et al show in Fig. 1-6, the random image element accessing means includes a plurality of first and a plurality of second conductors traversing the array, each individual image element or group of image elements being associated with a respective one of the plurality of first conductors and a respective one of the plurality of second conductors (row conductors  $Y_i$  and column conductors  $X_j$  are shown in Fig. 2) as to claim 2, means for photovoltaically producing an electrical charge in response to incident light and storage means for storing the charge at the image element (the photodiode PD

Art Unit: 2613

functions as current generator provides a current amplitude which directly related to the incident light level and a capacitor  $C_{PD}$  stores the charges from the photodiode PD as shown in Fig. 5A and 5B) as to claim 3, method for providing an image of a scene (a method for providing an image of a scene is performed by an image sensor system is shown in Fig. 1), providing an image element including a photovoltaic element which provides electric charge in response to light flux incident thereon (an image element of sensor 10 includes a photodiode PD which converts light incident to electrical signal), storing electric charge from the photovoltaic element at the image element (a capacitor  $C_{PD}$  stores the electrical charge from the photodiode PD) and connecting the stored charge to an output device only in response to an interrogation signal to the image element (a row decoder driver 12 and column decoder driver 14 selectively output the signal charge of the photodiode to a signal readout 16 as shown in Fig. 2) as to claim 34, providing an output amplifier at the image element as part of the output device (an output amplifier 100 or 102 in Fig. 100) as to claim 35, providing a switch connecting the stored charge to a reference voltage signal level, and closing the switch monetarily to reset the image element (when switches  $TRY_i$  are in open state, signal charges from photodiodes are connected to reference voltage  $V_{DD}$  col. 11, line 65, and when in a close state, the switches reset the

Art Unit: 2613

photodiodes by draining excess charges in HSLi lines) as to claim 40, providing an array of plural image elements each substantially identical with the first-recited image element, and providing the interrogation signal only to selected ones of the image elements in the array (a plurality of photodiodes  $P_{ij}$  are selected to read out in accordance with signals  $A_j, C_j$  and  $B_i, D_i$  as shown in Fig. 1) as to claim 42, providing an array of plural image elements each substantially identical with the first-recited image element, and simultaneously storing charge at each of the plural image elements to provide a snap shot of the scene (all of photodiodes PD are identical and simultaneously store charge in response to light incident on the sensor, Fig. 5A) as to claim 43, using a processor to provide the interrogation signal to the image element (a signal processor/computer 18 as shown in Fig. 1) as to claim 45, and providing a conductor traversing the substrate proximate to the photovoltaic element, carrying a reference voltage level on the conductor, and using the conductor to collect excess charge spilling from the image element in response to an excessive level of light flux incident thereon (horizontal sense lines HSLi include row reset switches TRGYi, and when the switches are open, the row sense lines HSLi are put under a voltage VRD so as to collect excess charge from the photodiodes PD as shown in Fig. 6) as to claim 47.

Art Unit: 2613

5. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 4, 7, 8 and 44 are rejected under 35 U.S.C. § 103 as being unpatentable over Wilder et al (cited by Applicant).

With regard to claim 4, Wilder et al disclose substantially the same subject matter claimed (as discussed in claims 1-3, 34, 35 and 43), except that the image elements each also includes means for draining stored charge from the charge storage means in response to an element resetting signal.

Although Wilder et al do not explicitly show each of the photodiodes PD which includes a draining means for draining charge from the capacitor  $C_{PD}$ , Wilder et al do show switches TRGY<sub>i</sub> located on image sense lines HSL<sub>i</sub>, which drain excess charges from the capacitor  $C_{PD}$  in accordance with reset signals VRG as shown in Fig. 6.

Art Unit: 2613

It is well known or matter of common knowledge to use the switch TRFYi in each photodiode circuit for the purpose of draining excess charge signals from the photodiode instead of using the switch on an output line. That is to say that the use of the switch in each image element also produces a same effect as of the one located on an output line.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made, to modify the circuit of each claimed image element by incorporating a switch TRYi in each of image elements in order to drain any excess charge from a photodidode of the circuit because it is an art recognized solution.

With regard to claims 7 and 8, although Wilder et al do not explicitly show each image element including an amplifier providing and output signal indicative of charge stored in the charge storage means such as a capacitor, Wilder et al do show an amplifier comprising MOSFET Tout and a resistor, which amplify charge signals from OSL lines upon a switching operation of switch TYOi as shown in Fig. 6, col.11, lines 62+ and col. 13 lines 1+). It is well known or matter of common knowledge to modify the image element of Wilder et al by incorporating the amplifier in each of image elements in order to amplify the charge signal from a photodiode PD. That produces a same result as that of the one located on an output line. Therefore, it

Art Unit: 2613

would have been obvious to one of ordinary skill in the art at the time of the invention was made to incorporate the amplifier and switch TYO<sub>i</sub> in each of image elements of Wilder et al in order to amplifying image signal from a photodiode since that is an art recognized solution.

Furthermore, the step of simultaneous closing each of the charge drainage switches at each of the image elements of the array (all of switches TRY<sub>i</sub> are closed at the same time upon applying reset signals VRG) as to claim 44.

6. Claims 5, 6, 9-18, 36, 37, 38, 39, 41, 46 and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no prior art which shows features such as "said charge draining means...an analogue voltage level" in claim 5, "said photodiode including...in said array" in claim 9, "a pair of decoders..decoders" in claim 10, "second means for storing...storage means." in claim 16, "a control cache memory...first-out basis." in claim 18, "providing...said transistor." in claim 36, "allowing...said output device." in claim 41, "using said processor...said charge thereto." in claim 46, and "providing...first out basis." in claim 48.



Serial Number: 08/486,005

-9-

Art Unit: 2613

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Itoh et al disclose a two-dimensional image read-out sensor device which comprises Y-line electrodes and X-line electrodes formed over an insulating substrate.

Mizoguchi et al disclose a solid-state imaging device with static induction transistor matrix.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to T. Ho whose telephone number is (703) 305-4943. The examiner can normally be reached on Mon-Fri from 8AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, M. Razavi, can be reached on (703) 305-4713. The fax phone number for this Group is (703) 305-9508.

Serial Number: 08/486,005

-10-

Art Unit: 2613

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-8576.

A handwritten signature in black ink, appearing to read 'T. Ho', with a stylized flourish at the end.

T. Ho

Patent Examiner

November 25, 1995